

ZOOLOGY.—*New millipeds of the spiroboloid genus Watichelus from the Pacific coast.*¹ H. F. LOOMIS, Coconut Grove, Fla.

The Southwestern United States and nearby Mexico are the home of a large family of spiroboloid millipeds, the Atopetholidae, most species of which have become known in the past 30 years. They appear to be extremely localized, and each suitable locality may have one or more representatives differing from all others. The rigors of climate in this usually arid region are such that migration of humus inhabitants from one section to another often is difficult and possible only at rare intervals if at all. This isolation of localities has caused "island faunas" of millipeds to develop and accounts for the large number of species of certain genera in several families there today. The new forms here described, combined with the genotype, furnish an excellent example of the development of multiple species in a limited area for all have come from small parts of the three southern counties in California and a small adjacent area in Lower California.

Type and paratype specimens of the species here described have been deposited in the U. S. National Museum.

Watichelus robustus, n. sp.

Specimens collected at Chula Vista, Calif., May 31, 1917 (female), by H. F. Loomis; January 23, 1921 (male type and female), by O. F. Cook; December 1921 (male and female) by C. G. Marshall.

Description.—Length 45 to 50 mm, diameter 6 to 7 mm, the females stouter than the males. Number of segments 40 to 42.

Color in alcohol chestnut-brown, the posterior subsegments darker except the margins, which are nearly colorless and transparent.

Head with the frontal groove long, the one on the vertex short and indistinct; a conspicuous transverse furrow above the clypeus on each side; the obliquely transverse striations of the front moderately deep; clypeal punctures 5-5; eye patch subtriangular and with about 30 ocelli arranged in seven longitudinal rows.

First segment slightly wider than segments immediately following, a distinct median emar-

gination in front and with anterior and posterior lateral emarginations shallow but evident; lateral angles long and slender but not strongly curved caudad; a marginal groove extending from near the apex of the angle beyond the anterior lateral emargination but not reaching behind the eye; surface feebly and irregularly striate and minutely punctate.

Segment 2 with the anteroventral margin rather thick and slightly raised.

Segment 3 with the ventral crest abruptly raised on the outer side, high and moderately long.

On following segments the forebelt has numerous closely placed transverse striae; midbelt very slightly convex, noticeably aciculated and with a very few punctations; hindbelt smoother and somewhat more shining than midbelt, faintly aciculated and punctate; transverse constriction shallow, the surface behind it slightly and evenly convex, not rising abruptly; dorsal median sulcus very faint, evident on the hindbelt only; pore somewhat removed in front of the constriction and followed by a sulcus on the hindbelt; ventral striations deeply impressed, the ridges between them, on the third quarter of the body, produced into strong marginal teeth.

Last segment hardly as long as the three preceding segments, the last two of which are strongly telescoped; apex rounded and with the transverse median impression faint or lacking.

Anal valves not strongly swollen, noticeably flattened behind along the margins which are but slightly depressed; surface with very coarse irregular wrinkles near opening. Preanal scale evenly rounded at apex; margin at base subsinuate and not greatly thickened; surface sparsely punctate-striate.

Sterna twice as broad as long and crossed by about five transverse striae.

Gonopods as shown in Figs. 1 and 2.

Males with ventral crest of seventh segment thick, short and low.

Third male legs with coxal lobes directed caudally, the lobes vertical and decreasing on ensuing legs.

Watichelus edentatus, n. sp.

A single male type collected on the eastern side of the mountains beside the road from San

¹ Received February 17, 1949.

Diego to El Centro, Calif., January 29, 1921, by O. F. Cook.

Diagnosis.—Distinguished by the more acute and bent lateral angles of the first segment and its shorter marginal groove, the lack of dentations on the hind margin of any of the segments, and by the male gonopods.

Description.—Length 38 mm; diameter 5 mm. Number of segments 46.

Head with a distinct median line on front and vertex but the two not joined; vertex finely rugulose; front with faint oblique transverse striations; clypeal punctures five on each side; eyes orbicular, composed of 25 or 26 inconspicuously raised ocelli in six longitudinal rows.

Segment 1 not wider than the following segments; the anterior median emargination broad

and shallow, that above the acute lateral angle on each side long and distinct, the produced angle strongly bent backward and with the posterior margin above it more deeply emarginate than in the other species; marginal impressed line short, extending half the distance from the angle to the eye; surface very feebly and sparsely punctate, coarsely and irregularly striate.

Segment 2 with the anterior lateral margin not conspicuously raised.

Segment 3 with ventral crest abruptly raised, high, but short.

Following segments with the transverse constriction shallow, the surface behind it hardly convex; forebelt smooth and crossed by several long transverse striae; midbelt with numerous fine, short, irregular striae and a few feeble punc-



FIGS. 1-10.—1, 2, Gonopods of *Watichelus robustus*, n. sp., anterior and posterior views respectively; 3, 4, gonopods of *Watichelus edentatus*, n. sp., anterior and posterior views, respectively; 5, 6, gonopods of *Watichelus cooki*, n. sp., anterior and posterior views, respectively; 7, 8, gonopods of *Watichelus emarginatus*, n. sp., anterior and posterior views, respectively; 9, 10, gonopods of *Watichelus parallelus*, n. sp., anterior and posterior views, respectively.

tations; hindbelt less striate but with distinct punctures widely placed; pore located well in advance of the constriction, in the midbelt, and followed by the impressed lateral sulcus on the hindbelt well above the line of the pores; ventral striations not as strong as in the other species and with the ridges between them not produced beyond the margin of the segment in sharp teeth.

Last segment broadly rounded, as long as the four preceding segments together; the penultimate segment is very short with the other three longer but subequal in length.

Anal valves scarcely exceeding the last segment, shining, the sides with widely scattered punctations and a few coarse wrinkles near the opening below the apex of the last segment.

Preanal scale nearly four times as wide as long, broadly rounded but subsinuate on each side; surface somewhat shining and with numerous impressed longitudinal aciculations.

Sterna of the legs two-thirds as long as broad.

Gonopods as shown in Figs. 3 and 4.

Male legs with coxal lobes small, those of the third legs largest, not caudally produced.

Ventral crest of seventh male segment rather thin and of moderate height and length, slightly excavated on either side in front to receive the tips of the gonopods.

***Watichelus cooki*, n. sp.**

A male (type) and female collected at Descanso, Lower California, January 1, 1931, by O. F. Cook.

Diagnosis.—Near *edentatus*, but with several differences of the gonopods and with the posterior lateral margin of some of the segments toothed.

Description.—Length 38 to 40 mm; width 5 mm.

Head with 29 to 31 ocelli in a rounded cluster of six or seven rows, median sulcus of vertex faint, sulcus of front strong; front crossed by five or six oblique transverse wrinkles, clypeal fovea five each side.

First segment wider than succeeding segments, with lateral angles acute and bent backward, both margins above the apex emarginate, the anterior emargination deeper and more extensive and with a margining rim to behind eye, no median emargination; surface aciculate-punctate.

Second segment with ventral anterior margin rather thin but little elevated.

Crest of segment 3 short but raised into a sharply triangular lobe.

Segments with lateral sulcus strongly impressed on hindbelt, the median sulcus not or only very faintly impressed, transverse constriction slight; forebelt crossed by several faint striations; midbelt smooth, hindbelt very minutely punctate; lateral striations quite distinct, the adjacent margin with a few small teeth projecting beyond it; pore in midbelt, directly in front of the lateral sulcus.

Last segment as long as the three preceding segments together, broadly rounded and with a slight depression before the apex.

Anal valves quite strongly inflated, little flattened behind, meeting in a deep groove; surface more or less coarsely wrinkled.

Preanal scale three times as broad as long.

Sterna less than twice as broad as long crossed by five or six striations.

Gonopods as shown in Figs. 5 and 6.

Ventral crest of seventh segment short, thick, high and inclined sharply backward.

Coxal of male legs 3-6 little produced, those of legs 7 more so.

***Watichelus smithi* (Chamberlin)**

Watichelus smithi (Chamberlin), Proc. Acad. Nat. Sci. Philadelphia 99: 49-50. 1947.

This is the smallest and slenderest species of the genus and with only four clypeal fovea. The gonopods bear some resemblance to those of *cooki*, but differences are obvious.

***Watichelus emarginatus*, n. sp.**

Three males (one the type) and a female from Lower California, "8 miles down" (below Tia Juana), January 1, 1925, O. F. Cook.

Diagnosis.—The less heavily constructed, more slender, inner gonopods, and the definitely emarginate penultimate segment distinguish this species.

Description.—Length 30 to 42 mm; width 4 to 5.5 mm. Number of segments 42-44.

Head with a distinct median sulcus on front and a faint one on vertex; surface with impressed, sometimes anastomosing, lines; clypeal fovea five on each side; ocelli about 32 in seven rows.

Segment 1 as wide as the next segments, with angles moderately produced and bent backward, a strong submarginal sulcus reaching to behind the eye; anterior and posterior emargination strong.

Segment 2 with anterior ventral margin thin and elevated.

Segment 3 with ventral crest rising abruptly into a triangular projection.

Segments with transverse constriction scarcely evident; forebelt transversely crossed by five or six almost continuous striae; midbelt faintly aciculated, otherwise smooth; hindbelt punctate and with minute longitudinal scratches; pore well in front of the hindbelt, followed by the impressed sulcus; median sulcus seldom evident; lateral striations well impressed, the upper posterior surfaces between them developed into minute marginal teeth, penultimate segment with a short but definite emargination of the back margin at middle.

Last segment as long as the three preceding segments, rather narrowly rounded behind, the apex usually preceded by a slight transverse depression.

Preanal scale broadly rounded, about three times as broad as long, surface smooth.

Anal valves moderately inflated, surface very coarsely wrinkled.

Sterna nearly twice as broad as long, crossed by six or seven striae.

Gonopods as shown in Figs. 7 and 8, with the inner gonopods more slender and less sturdy than in the other species.

Seventh segment of male with ventral crest moderately thick, long and high, inclined backward, and with the anterior face each side excavated to receive the tips of the gonopods.

In the males the coxal lobes of third legs are thicker but not as high as those of the legs that follow, where the lobes are subequal in size.

Watichelus parallelus, n. sp.

Collected at Chula Vista, Calif., January 23, 1921 (male and female), by O. F. Cook, and December 1921 (male type) by C. G. Marshall.

Diagnosis.—Distinguished by the strongly trifurcate inner gonopods, the pronounced denticulate segment margins, and the short angles of the first segment.

Description.—Length 36 to 40 mm; width 5.3 to 6 mm. Number of segments 40 to 42.

Head with the median grooves of the front and vertex distinct; vertex rugose along posterior portion; front with a strong transverse furrow either side of the median groove with other oblique and less distinct furrows above the transverse one; clypeus with five fovea each side; eye patch suborbicular, composed of about 30 ocelli in six rows.

Segment 1 as wide as the succeeding segments; lateral angle on each side shorter and not narrowed as much as in the other species although it still is curved backward somewhat.

Segment 2 with the anteroventral margin thin and greatly raised.

Segment 3 with ventral crest thin, rather short, and moderately raised.

Succeeding segments with the forebelt transversely striate; midbelt flat, not in the least convex, finely and thickly aciculated longitudinally; hindbelt punctate, inconspicuously striate, hardly more shining than midbelt; the transverse constriction distinct, the posterior subsegment evenly and rather strongly convex; pore located in front of the constriction; median and lateral grooves impressed on the hindbelt only, the latter behind or a little above the line of the pores and not showing the distinct offset apparent in *edentatus*; ventral striations pronounced, the upper corners of the areas between them produced beyond the hind margins of the segments into sharp, slightly upcurved teeth, especially conspicuous on the third quarter of the body.

The four segments preceding the last strongly telescoped and together about equalling it in length.

Last segment crossed behind middle by a broad variably evident impression; apex evenly rounded.

Anal valves vertical, moderately inflated and meeting in a shallow groove; surface with fine punctations and larger ones on the sides, and also with a number of coarse irregular striations.

Preanal scale longer than in other species, broadly rounded; surface shining and with a suggestion of punctures and short scratches.

Sterna of the legs two-thirds as long as broad, the sides nearly parallel.

Gonopods as shown in Figs. 9 and 10.

Segment 7 of male with ventral crest thick, high, and long.

Coxal lobes of third male legs vertical, thicker but not so high as those of fourth and fifth legs.

Another species that eventually may need to be placed in this genus is *Atopetholus paroicus* Chamberlin (Bull. Univ. Utah **31**: 7. 1941), based on females only, whose outstanding character was the first segment, which is typical of that in *Watichelus*. Males from the type locality will be needed to determine the correct generic assignment.